

Patent Claims

1. Damping device (1) for damping the kinetic energy of movable cabinet components, which include:

a first damping element (2; 102) with a first cylinder (3; 103) that has a first piston (4; 104), which slides lengthwise in it and at least one second damping element (20; 120) with a second cylinder (21; 121) that has a second piston (22; 122), which slides lengthwise in it; whereby, both damping elements are located one behind the other in a serial arrangement and form an integral system,

is characterized by

the fact that each of the damping elements (2; 20; 102; 120) is designed as a pneumatic (air) damper and each one has a compression chamber (8 and/or 26; 108 and/or 126) and an expansion chamber (9 and/or 27; 109 and/or 127) that have variable volumes; whereby, the damping effects of the damping elements are affected by the guide canals (7, 12, 112, 125, 130), which control the air distribution and air flow within and between the compression chambers and/or the expansion chambers.
2. Damping device, according to claim 1, is characterized by the fact that each damping element (2; 20; 102; 120) has a seal (5, 23; 105; 123) between the largest diameter of the respective piston and the inside diameter of the corresponding cylinder.

3. Damping device, according to one of the claims 1 or 2, is characterized by the fact that the piston of the first damping element is directly affected by the piston of the second damping element during the entire operating distance of the damping device.
4. Damping device, according to one of the claims 1 to 3, is characterized by the fact that the second expansion chamber follows directly the first compression chamber and is separated from this by a partition (30; 140).
5. Damping device, according to one of the claims 1 to 4, is characterized by the fact that the piston rod of the second piston projects through an opening in the partition (30; 140) into the first compression chamber so that the front side of the second piston rod is taken up into a respective recess (10; 110).
6. Damping device, according to one of the claims 1 to 5, is characterized by the fact that a seal (31; 141) is provided between the piston rod of the second piston and the bore hole of the partition.
7. Damping device, according to one of the claims 1 to 6, is characterized by the fact that a spring (32; 142) is located in the second damping element in order to affect resetting force on the damping elements.

8. Damping device, according to one of the claims 1 to 7, is characterized by the fact that the second expansion chamber is connected to the external environment by an opening (28; 128).
9. Damping device, according to one of the claims 1 to 8, is characterized by the fact that the piston rod of the first piston is guided through a cylinder cap (11; 111) into the open; whereby, the first expansion chamber is connected by a remaining gap between a cylinder cap (11; 111) and piston rod (4; 104) remaining gap with the external environment.
10. Damping device, according to one of the claims 1 to 9, is characterized by the fact that the first piston (4) has in the longitudinal direction a guide canal (7) in the form of a through-bore-hole, which connects the first compression chamber (8) with the external environment.
11. Damping device, according to one of the claims 1 to 10, is characterized by the fact that the second piston (22) has in the longitudinal direction a guide canal (25) in the form of a through-bore-hole that connects the second compression chamber (26) with the external environment.
12. Damping device, according to one of the claims 1 to 11, is characterized by the fact that both guide canals (7, 25) are connected air-guided to each other.

13. Damping device, according to one of the claims 1 to 12, is characterized by the fact that a leakage canal (12) is formed in the recess (10) area, which connects the first compression chamber (8) to the guide canal (7).
14. Damping device, according to one of the claims 1 to 9, is characterized by the fact that a guide canal (125) is located on the outside and in the longitudinal direction of the second piston rod (124), going out from its free end, which extends over a certain length of the piston rod (124) and during a certain section of the operating distance of the second piston (122), connects the first compression chamber (108) connects to the second expansion chamber (127).
15. Damping device, according to one of the claims 1 to 9 or 14, is characterized by the fact that a guide canal (130) is located on the inner wall and in the longitudinal direction of the second cylinder (121), going out from the end area of the cylinder and extends over a certain length of the cylinder and during a certain section of the operating distance of the second piston (124), connecting the second compression chamber (126) to the second expansion chamber (127).
16. Damping device, according to one of the claims 1 to 9, is characterized by the fact that the second piston (22) has in the longitudinal direction a guide canal (25) in the form of a through-bore-hole, which connects the first compression chamber (108) to the second compression chamber (127).

17. Damping device, according to one of the claims 1 to 9 or 16, is characterized by the fact that a guide canal (130) is located on the inner wall and in the longitudinal direction of the second cylinder (121) and goes out from the end area of the cylinder, which extends over a certain length of the cylinder and during a certain section of the operating distance of the second piston (22), the second compression chamber (126) connects with the second expansion chamber (127).